

COURSE OUTLINE

(1) GENERAL

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| SCHOOL | SCHOOL OF BUSINESS | | |
| ACADEMIC UNIT | DEPARTMENT OF SHIPPING, TRADE AND TRANSPORT | | |
| LEVEL OF STUDIES | POSTGRADUATE (MSc) “MBA in Shipping” | | |
| COURSE CODE | 12051-14 | SEMESTER | 2nd Semester (Spring) |
| COURSE TITLE | SHIPPING AND THE ENVIRONMENT- REGULATIONS IN SHIPPING | | |
| INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i> | WEEKLY TEACHING HOURS | CREDITS | |
| Lectures | 3 | 4 | |
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| <i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i> | | | |
| COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i> | Special background | | |
| PREREQUISITE COURSES: | - | | |
| LANGUAGE OF INSTRUCTION and EXAMINATIONS: | English | | |
| IS THE COURSE OFFERED TO ERASMUS STUDENTS | Yes | | |
| COURSE WEBSITE (URL) | https://www.stt.aegean.gr/mba-in-shipping/programma-mathimaton/ | | |

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

After successfully completing this course, the students will be able to:

1. Understand deeply the drivers, pressures, and impacts of shipping on the marine and atmospheric environment,

2. Know the key points of the regulatory framework and be able to use them in problems they will face in their work,
3. Identify the links of the framework for the shipping to the general framework for environmental protection,
4. Understand the innovations on the design, technology, and operation of ships to reduce their environmental impact.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

- Search for, analysis and synthesis of data and information, with the use of the necessary technology,
- Working independently,
- Teamwork,
- Working in an interdisciplinary environment,
- Respect for the natural environment,
- Production of free, creative, and inductive thinking.

(3) SYLLABUS

The last years, environmental protection has become a global priority. The concept of sustainability implies that economic development should be accompanied by social welfare and environmental protection. In this framework, the course attempts a holistic approach on studying the interactions between shipping and the environment by first defining the problem, then analyzing the relevant legislation and finally discussing the innovations in the technologies and operations on-board that this framework requires.

1. Shipping and its impact on the environment – the various issues and the role of shipping compared to other transport sectors and other human activities.
2. Oil pollution from ships – the risks and measures in place.
3. Ballast water and impact on marine ecosystems – management and treatment.
4. Air pollution from ships (SO₂, NO_x, PM), impacts and response measures.
5. Greenhouse gases from shipping and measures adopted to reduce emissions.
6. Ship recycling – the issues and solutions. Hull (antifouling) coatings.

(4) TEACHING and LEARNING METHODS - EVALUATION

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| DELIVERY <i>Face-to-face, Distance learning, etc.</i> | Face to face and distance synchronous transmission of lectures |
| USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory</i> | <ul style="list-style-type: none"> • Lectures using computer presentations and video |

| <p><i>education, communication with students</i></p> | <ul style="list-style-type: none"> Support of learning and communication with the students using the e-learning platforms e-class and Big Blue Button | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|-----------------|--------------------------|---|----------|------------------------------------|----------|---------------|----------|--------------------|----------|--|--|--|--|--|--|--|--|--|--|--------------|-----------|
| <p>TEACHING METHODS <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i></p> | <table border="1"> <thead> <tr> <th>Activity</th> <th>Semester workload</th> </tr> </thead> <tbody> <tr> <td>Lectures (including industry speaker short presentations)</td> <td>18 hours</td> </tr> <tr> <td>Study and analysis of bibliography</td> <td>27 hours</td> </tr> <tr> <td>Essay writing</td> <td>30 hours</td> </tr> <tr> <td>Non-directed study</td> <td>25 hours</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>Course total</td> <td>100 hours</td> </tr> </tbody> </table> | | Activity | Semester workload | Lectures (including industry speaker short presentations) | 18 hours | Study and analysis of bibliography | 27 hours | Essay writing | 30 hours | Non-directed study | 25 hours | | | | | | | | | | | Course total | 100 hours |
| Activity | Semester workload | | | | | | | | | | | | | | | | | | | | | | | |
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| <p>STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p> | <p>Language of the evaluation: English</p> <ul style="list-style-type: none"> At the end of the course, the students will write a final exam (60% of the rating). Types of questions: multiple choice questionnaires, short-answer questions, open-ended questions. During the semester, the students will prepare and submit short, directed essays (40% of the rating) using real data from the operation of the ship. | | | | | | | | | | | | | | | | | | | | | | | |

(5) ATTACHED BIBLIOGRAPHY

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| <p>- Suggested bibliography: <i>General sources on the topic, available in the Library of the UAegean or on-line:</i></p> <ul style="list-style-type: none"> Andersson K., Brynolf S., Lindgren J.F., Wilewska-Bien M. (Editors), 2016. Shipping and the Environment, 426 pp., Springer, Berlin, Heidelberg. Asariotis, R., & Benamara, H. (Eds.), 2012. Maritime transport and the climate change challenge. Routledge. |
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- David, M., Gollasch, S., & Hewitt, C., 2015. Global Maritime Transport and Ballast Water Management. Springer Science.
- DNV-GL, 2020. Maritime Forecast to 2050, Energy Transition Outlook 2020, available at <https://download.dnvgl.com/eto-2020-download>
- EMSA, 2020. European Maritime Transport Environmental Report (EMTER) available at <https://eclass.aegean.gr/modules/document/index.php?course=TNEY309&openDir=/601e4069cHLC>
- IMO, 2005. Ballast Water Convention, International Maritime Organization, London.
- IMO, n.d.. Marine Environment, available at <http://www.imo.org/en/OurWork/Environment/Pages/Default.aspx>
- Kotrikla A.M. 2016. Shipping and the Environment, Repository for Greek Academic Electronic Textbooks, Hellenic Academic Libraries Link (in Greek), available at <https://repository.kallipos.gr/handle/11419/5478>.
- Tan A. K.-J, 2006. "Vessel Source Marine Pollution. The Law and Politics of International Regulation", Cambridge University Press, Cambridge.
- Tselentis V., 2008. Management of marine environment and shipping, Stamouli publishing, Athens (in Greek).

Sources focusing on Specific Issues:

- Kotrikla A.M., 2021. An analysis of THETIS-MRV data on CO₂ emissions from shipping, 17th International Conference on Environmental Science and Technology, CEST2021, 1-4 September 2021, Athens, Greece.
- Kotrikla A.M., Zavantias A., Kaloupi M., 2021. Waste generation and management onboard ships: The case of a cruise ship, Marine Pollution Bulletin (Submitted).
- Kotrikla A.M., 2017. Green versus Sustainable: The Case of Shipping, 15th International Conference on Environmental Science and Technology, CEST2017, 31st August - 2nd September 2017, Rhodes, Greece.
- Kotrikla A.M., Andrea V., Nikitakos N., Stylios C., 2019. European environmental compulsory framework on shipping and ports, 16th International Conference on Environmental Science and Technology, CEST2019, 4-7 September 2019, Rhodes, Greece.
- Pariotis E G, Zannis T C, Yfantis E A, Roumeliotis I and Katsanis J S, 2016. "Energy Saving Techniques in Ships - Technical & Operational Measures", ASHRAE 1st International Conference on Energy in Transportation, Greece.
- Vallis A G, Zannis T C, Yfantis E A, Asimakopoulou K D, Pariotis E G and Katsanis J S, 2020. "Thermal, Environmental and Economic Study of a Marine Diesel Engine Waste Heat Recovery Dual-Loop Bottoming System", 14th Annual Meeting on Marine Technology, Hellenic Institute of Marine Technology, Greece.
- Yfantis E A, Katsanis J S, Pariotis E G and Zannis T C, 2019. "Methanol as a Low-Carbon and Sulphur-Free Alternative Fuel for Shipping: Prospects and Challenges", 13th Annual Meeting on Marine Technology, Hellenic Institute of Marine Technology, Greece.
- Yfantis E A, Zannis T C, Pariotis E G and Katsanis J S, 2019. "Alternative Maritime Fuels - The Case of Methanol", SAFETY4SEA Conference in Cyprus.
- Yfantis E A, Zannis T C, Pariotis E G, Katsanis J S and Roumeliotis I, 2016. "CO₂ Emissions from Ships: Reduction Methods and Technologies", ASHRAE 1st International Conference on Energy in Transportation, Greece.
- Yfantis E A, Zannis T C, Pariotis E G, Katsanis J S and Roumeliotis I, 2016. "NO_x Reduction Technologies for Marine Diesel Engines- Operational, Environmental and Economic Aspects", ASHRAE International Conference on Green Transportation, Greece.

- Zannis T C, Yfantis E A, Katsanis J S and Pariotis E G, 2017. “Marine DeSOx Systems: A State-of-the-Art Evaluation”, ASHRAE 2nd International Conference on Energy in Transportation, Greece.
- Zannis T C, Yfantis E A, Katsanis J S, Pariotis E G and Papagiannakis R G, 2017. “Review of the Modern Marine Technologies for Emission Treatment and SOx Reduction– Part I: Principles of Operation and Constructional Specifics and Part II: Practical Applications, Performance Characteristics and Financial Data”, 11th Annual Meeting on Marine Technology, Hellenic Institute of Marine Technology, Greece.

- *Related academic journals:*

- Marine Policy
- Maritime Policy and Management

Transportation Research Part D: Transport and the Environment